

## CLAIMS

- 1 1. A method for displaying a quality of a wireless data transmission comprising:  
2 receiving the wireless data transmission wherein the wireless data transmission  
3 originates from multiple transmit antennae;  
4 determining the quality of the wireless data transmission based on a quality  
5 parameter of the wireless data transmission; and  
6 displaying the quality of the wireless data transmission.
- 1 2. The method of claim 1 wherein the wireless data transmission comprises multiple  
2 streams of data and determining the quality of the wireless data transmission based on a  
3 quality parameter of the wireless data transmission comprises:  
4 determining a value of the quality parameter for each of the multiple streams of  
5 data.
- 1 3. The method of claim 1 wherein the wireless data transmission comprises multiple  
2 streams of data and determining the quality of the wireless data transmission based on a  
3 quality parameter of the wireless transmission comprises:  
4 determining an aggregate value of the quality parameter for the multiple streams  
5 of data.
- 1 4. The method of claim 2 wherein the quality parameter is selected from a group  
2 consisting of a bit error rate, a packet error rate and a frame error rate.

1 5. The method of claim 3 wherein the quality parameter is selected from a group  
2 consisting of a bit error rate, a packet error rate and a frame error rate.

1 6. The method of claim 2 wherein the quality parameter is selected from a group  
2 consisting of a signal-to-noise ratio, a carrier-to-interference ratio and a signal-to-  
3 interference plus noise ratio.

1 7. The method of claim 3 wherein the quality parameter is selected from a group  
2 consisting of a signal-to-noise ratio, a carrier-to-interference ratio and a signal-to-  
3 interference plus noise ratio.

1 8. The method of claim 2 wherein the quality parameter comprises the number of  
2 cyclic redundancy check failures.

1 9. The method of claim 3 wherein the quality parameter comprises the number of  
2 cyclic redundancy check failures.

1 10. The method of claim 1 wherein the wireless data transmission comprises multiple  
2 streams of data and determining the quality of the wireless data transmission based on a  
3 quality parameter of the wireless data transmission comprises:

4 determining a propagation channel for the wireless data transmission; and

5 determining a value for the quality parameter based on the propagation channel.

1 11. The method of claim 10 wherein the quality parameter is selected from a group  
2 consisting of a bit error rate of each of the multiple streams of data, a packet error rate of  
3 each of the multiple streams of data, a frame error rate of each of the multiple streams of  
4 data.

1 12. The method of claim 10 wherein the quality parameter is selected from a group  
2 consisting of a bit error rate of the multiple streams of data, a packet error rate of the  
3 multiple streams of data, a frame error rate of the multiple streams of data.

1 13. The method of claim 10 wherein the quality parameter is selected from a group  
2 consisting of a signal-to-noise ratio of each of the multiple streams of data, a carrier-to-  
3 noise ratio of each of the multiple streams of data, and a signal-to-interference plus noise  
4 ratio of each of the multiple streams of data.

1 14. The method of claim 10 wherein the quality parameter is selected from a group  
2 consisting of a signal-to-noise ratio of the multiple streams of data, a carrier-to-noise ratio  
3 of the multiple streams of data, and a signal-to-interference plus noise ratio of the  
4 multiple streams of data.

1 15. The method of claim 10 wherein the quality parameter is selected from a group  
2 consisting of a channel condition number, a delay spread, a time variance, and a  
3 frequency variance.  
4

5 16. A method for displaying a quality of a wireless data transmission comprising:  
6 receiving the wireless data transmission wherein the wireless data transmission  
7 originates from a communication system comprising multiple transmit antennae and  
8 multiple receive antennae;  
9 determining the quality of the wireless data transmission based on a quality  
10 parameter of the wireless data transmission; and  
11 displaying the quality of the wireless data transmission.

1 17. The method of claim 16 wherein the wireless data transmission comprises  
2 multiple streams of data and determining the quality of the wireless data transmission  
3 based on a quality parameter of the wireless data transmission comprises:  
4 determining a value of the quality parameter for each of the multiple streams of  
5 data.

1 18. The method of claim 16 wherein the wireless data transmission comprises  
2 multiple streams of data and determining the quality of the wireless data transmission  
3 based on a quality parameter of the wireless transmission comprises:  
4 determining an aggregate value of the quality parameter for the multiple streams  
5 of data.

1 19. The method of claim 17 wherein the quality parameter is selected from a group  
2 consisting of a bit error rate, a packet error rate and a frame error rate.

1 20. The method of claim 18 wherein the quality parameter is selected from a group  
2 consisting of a bit error rate, a packet error rate and a frame error rate.

1 21. The method of claim 17 wherein the quality parameter is selected from a group  
2 consisting of a signal-to-noise ratio, a carrier-to-interference ratio and a signal-to-  
3 interference plus noise ratio.

1 22. The method of claim 18 wherein the quality parameter is selected from a group  
2 consisting of a signal-to-noise ratio, a carrier-to-interference ratio and a signal-to-  
3 interference plus noise ratio.

1 23. The method of claim 17 wherein the quality parameter comprises the number of  
2 cyclic redundancy check failures.

1 24. The method of claim 18 wherein the quality parameter comprises the number of  
2 cyclic redundancy check failures.

1 25. The method of claim 16 wherein the wireless data transmission comprises  
2 multiple streams of data and determining the quality of the wireless data transmission  
3 based on a quality parameter of the wireless data transmission comprises:  
4 determining a propagation channel for the wireless data transmission; and  
5 determining a value for the quality parameter based on the propagation channel.

1 26. The method of claim 25 wherein the quality parameter is selected from a group  
2 consisting of a bit error rate of each of the multiple streams of data, a packet error rate of  
3 each of the multiple streams of data, a frame error rate of each of the multiple streams of  
4 data.

1 27. The method of claim 25 wherein the quality parameter is selected from a group  
2 consisting of a bit error rate of the multiple streams of data, a packet error rate of the  
3 multiple streams of data, a frame error rate of the multiple streams of data.

1 28. The method of claim 25 wherein the quality parameter is selected from a group  
2 consisting of a signal-to-noise ratio of each of the multiple streams of data, a carrier-to-  
3 noise ratio of each of the multiple streams of data, and a signal-to-interference plus noise  
4 ratio of each of the multiple streams of data.

1 29. The method of claim 25 wherein the quality parameter is selected from a group  
2 consisting of a signal-to-noise ratio of the multiple streams of data, a carrier-to-noise ratio  
3 of the multiple streams of data, and a signal-to-interference plus noise ratio of the  
4 multiple streams of data.

1 30. The method of claim 25 wherein the quality parameter is selected from a group  
2 consisting of a channel condition number, a delay spread, a time variance, and a  
3 frequency variance.

1 31. A method for displaying a quality of a wireless data transmission comprising:  
2 receiving the wireless data transmission wherein the wireless data transmission  
3 originates from a spatial multiplexing system;  
4 determining the quality of the wireless data transmission based on a quality  
5 parameter of the wireless data transmission; and  
6 displaying the quality of the wireless data transmission.

1 32. The method of claim 31 wherein the wireless data transmission comprises  
2 multiple streams of data and determining the quality of the wireless data transmission  
3 based on a quality parameter of the wireless data transmission comprises:  
4 determining a value of the quality parameter for each of the multiple streams of  
5 data.

1 33. The method of claim 31 wherein the wireless data transmission comprises  
2 multiple streams of data and determining the quality of the wireless data transmission  
3 based on a quality parameter of the wireless transmission comprises:  
4 determining an aggregate value of the quality parameter for the multiple streams  
5 of data.

1 34. The method of claim 32 wherein the quality parameter is selected from a group  
2 consisting of a bit error rate, a packet error rate and a frame error rate.

1 35. The method of claim 32 wherein the quality parameter is selected from a group  
2 consisting of a bit error rate, a packet error rate and a frame error rate.

1 36. The method of claim 32 wherein the quality parameter is selected from a group  
2 consisting of a signal-to-noise ratio, a carrier-to-interference ratio and a signal-to-  
3 interference plus noise ratio.

1 37. The method of claim 33 wherein the quality parameter is selected from a group  
2 consisting of a signal-to-noise ratio, a carrier-to-interference ratio and a signal-to-  
3 interference plus noise ratio.

1 38. The method of claim 32 wherein the quality parameter comprises the number of  
2 cyclic redundancy check failures.

1 39. The method of claim 33 wherein the quality parameter comprises the number of  
2 cyclic redundancy check failures.

1 40. The method of claim 31 wherein the wireless data transmission comprises  
2 multiple streams of data and determining the quality of the wireless data transmission  
3 based on a quality parameter of the wireless data transmission comprises:  
4 determining a propagation channel for the wireless data transmission; and  
5 determining a value for the quality parameter based on the propagation channel.



1 41. The method of claim 40 wherein the quality parameter is selected from a group  
2 consisting of a bit error rate of each of the multiple streams of data, a packet error rate of  
3 each of the multiple streams of data, a frame error rate of each of the multiple streams of  
4 data.

1 42. The method of claim 40 wherein the quality parameter is selected from a group  
2 consisting of a bit error rate of the multiple streams of data, a packet error rate of the  
3 multiple streams of data, a frame error rate of the multiple streams of data.

1 43. The method of claim 40 wherein the quality parameter is selected from a group  
2 consisting of a signal-to-noise ratio of each of the multiple streams of data, a carrier-to-  
3 noise ratio of each of the multiple streams of data, and a signal-to-interference plus noise  
4 ratio of each of the multiple streams of data.

1 44. The method of claim 40 wherein the quality parameter is selected from a group  
2 consisting of a signal-to-noise ratio of the multiple streams of data, a carrier-to-noise ratio  
3 of the multiple streams of data, and a signal-to-interference plus noise ratio of the  
4 multiple streams of data.

1 45. The method of claim 40 wherein the quality parameter is selected from a group  
2 consisting of a channel condition number, a delay spread, a time variance, and a  
3 frequency variance.

1 46. An apparatus for displaying the quality of a wireless data transmission

2 comprising:

3 means for receiving the wireless data transmission wherein the wireless data

4 transmission originates from multiple transmit antennae;

5 means for determining the quality of the wireless data transmission based on a

6 quality parameter of the wireless data transmission; and

7 means for displaying the quality of the wireless data transmission.

1 47. The apparatus of claim 46 wherein the wireless data transmission comprises

2 multiple streams of data and the means for determining the quality of the wireless data

3 transmission based on a quality parameter of the wireless data transmission further

4 comprises:

5 means for determining a value of the quality parameter for each of the multiple

6 streams of data transmission.

1 48. The apparatus of claim 46 wherein the means for determining the quality of the

2 wireless data transmission based on a quality parameter of the wireless data transmission

3 further comprises:

4 means for determining an aggregate value of the quality parameter for the

5 multiple streams of data.

1 49. The apparatus of claim 47 wherein the means for displaying the quality of the

2 wireless transmission comprises means for displaying the value.

1 50. The apparatus of claim 48 wherein means for displaying the quality of the  
2 wireless transmission comprises means for displaying the aggregate value.

1 51. The apparatus of claim 49 wherein the means for displaying the value comprises  
2 LED indicators.

1 52. The apparatus of claim 49 wherein the means for displaying the value comprises  
2 an analog meter.

1 53. The apparatus of claim 50 wherein the means for displaying the value comprises  
2 separate sets of LED indicators wherein each of the separate sets of LED indicators  
3 corresponds to each of the multiple streams of data.

1 54. The apparatus of claim 50 wherein the means for displaying the aggregate value  
2 comprises an analog meter.

1 55. The apparatus of claim 49 wherein the quality parameter comprises a channel  
2 quality parameter and a data quality parameter and the means for displaying the value of  
3 the quality parameter comprises a first and second analog meter wherein the first analog  
4 meter displays the value of the channel quality parameter and the second analog meter  
5 displays the value of the data quality parameter.

1 56. The apparatus of claim 49 wherein the quality parameter comprises a channel  
2 quality parameter and a data quality parameter and the means for displaying the value of  
3 the quality parameter comprises a first and second set of LED indicators wherein the first  
4 set of LED indicators corresponds to the channel quality parameter and the second set of  
5 Led indicators corresponds to the data quality parameter.

1 57. A wireless communication system comprising:  
2 a base transceiver station wherein the base transceiver station includes a multiple  
3 transmit antennae array;  
4 means for receiving a wireless data transmission from the multiple transmit  
5 antennae array;  
6 means for determining a quality of the wireless data transmission based on a  
7 quality parameter of the wireless data transmission; and  
8 means for displaying the quality of the wireless data transmission.

1 58. The system of claim 57 wherein the wireless data transmission comprises multiple  
2 streams of data and the means for determining the quality of the wireless data  
3 transmission based on a quality parameter of the wireless data transmission comprises:  
4 means for determining a value of the quality parameter for each of the multiple  
5 streams of data.

1 59. The system of claim 57 wherein the wireless data transmission comprises multiple  
2 streams of data and the means for determining the quality of the wireless data  
3 transmission based on a quality parameter of the wireless transmission comprises:  
4 means for determining an aggregate value of the quality parameter for the  
5 multiple streams of data.

1 60. The system of claim 58 wherein the quality parameter is selected from a group  
2 consisting of a bit error rate, a packet error rate and a frame error rate.

1 61. The system of claim 59 wherein the quality parameter is selected from a group  
2 consisting of a bit error rate, a packet error rate and a frame error rate.

1 62. The system of claim 58 wherein the quality parameter is selected from a group  
2 consisting of a signal-to-noise ratio, a carrier-to-interference ratio and a signal-to-  
3 interference plus noise ratio.

1 63. The system of claim 59 wherein the quality parameter is selected from a group  
2 consisting of a signal-to-noise ratio, a carrier-to-interference ratio and a signal-to-  
3 interference plus noise ratio.

1 64. The system of claim 58 wherein the quality parameter comprises the number of  
2 cyclic redundancy check failures.

1 65. The system of claim 59 wherein the quality parameter comprises the number of  
2 cyclic redundancy check failures.

1 66. The system of claim 57 wherein the wireless data transmission comprises multiple  
2 streams of data and the means for determining the quality of the wireless data  
3 transmission based on a quality parameter of the wireless data transmission comprises:  
4 means for determining a propagation channel for the wireless data transmission;  
5 and  
6 means for determining a value for the quality parameter based on the propagation  
7 channel.

1 67. The system of claim 66 wherein the quality parameter is selected from a group  
2 consisting of a bit error rate of each of the multiple streams of data, a packet error rate of  
3 each of the multiple streams of data, a frame error rate of each of the multiple streams of  
4 data.

1 68. The system of claim 66 wherein the quality parameter is selected from a group  
2 consisting of a bit error rate of the multiple streams of data, a packet error rate of the  
3 multiple streams of data, a frame error rate of the multiple streams of data.

1 69. The system of claim 66 wherein the quality parameter is selected from a group  
2 consisting of a signal-to-noise ratio of each of the multiple streams of data, a carrier-to-

3 noise ratio of each of the multiple streams of data, and a signal-to-interference plus noise  
4 ratio of each of the multiple streams of data.

1 70. The system of claim 66 wherein the quality parameter is selected from a group  
2 consisting of a signal-to-noise ratio of the multiple streams of data, a carrier-to-noise ratio  
3 of the multiple streams of data, and a signal-to-interference plus noise ratio of the  
4 multiple streams of data.

1 71. The system of claim 66 wherein the quality parameter is selected from a group  
2 consisting of a channel condition number, a delay spread, a time variance, and a  
3 frequency variance.

1 72. A wireless communication system comprising:  
2 a base transceiver station wherein the base transceiver station includes a multiple  
3 transmit antennae array;  
4 a multiple receive antennae array for receiving a wireless data transmission from  
5 the multiple transmit antennae array;  
6 means for determining a quality of the wireless data transmission based on a  
7 quality parameter of the wireless data transmission; and  
8 means for displaying the quality of the wireless data transmission.

1 73. A wireless communication system comprising:

- 2 a base transceiver station wherein the base transceiver station implements a
- 3 spatial multiplexing technology;
- 4 means for receiving a wireless data transmission from the base station;
- 5 means for determining a quality of the wireless data transmission based on a
- 6 quality parameter of the wireless data transmission; and
- 7 means for displaying the quality of the wireless data transmission.